Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Optical trapping and manipulations for single airborne particle studies CHUJI WANG, ZHIYONG GONG, Mississippi State University, GORDEN VIDEEN, YONG-LE PAN, ARMY RESEARCH LAB, MISSISSIPPI STATE UNIVERSITY TEAM, ARMY RESEARCH LAB TEAM — The first demonstration of optical trapping (OT) was done in 1970 by Arthur Ashkin. Single airborne particles can be levitated, trapped, and transported in air using light force under appropriate arrangements. Most airborne particles are nontransparent, therefore both radiation pressure force and photophoretic force account for the status of motion of the particles, which is often further compounded by many other factors, such as drag force, air turbulence, particle properties as well their changes overtime. This nature makes the single airborne particle study a challenging yet attractive topic. When a single airborne particle is trapped in air, its time-dependent physical and chemical properties reveal exact particle dynamics without surface interferences. We can examine a single particle layer-by-layer, its chemical phase separation, morphology, up-take and evaporation, photochemical processes, fluorescence, using OT-Raman spectroscopy, cavity ringdown spectroscopy (CRDS), light-scattering techniques, or their combination. We can even now look at chemical compositions point-by-point within a single particle. Significant strides have been made in single particle studies using OT and manipulations to date, yet many more challenges have not been addressed. This talk will discuss current status and future perspectives in single airborne particle studies using OT and manipulations.

Chuji Wang
Mississippi State University

Date submitted: 06 Feb 2019 Electronic form version 1.4